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Active Structural-Acoustic Control of Laminated Cylindrical Panels Using Vertically/Obliquely Reinforced 1-3 Piezoelectric Composite

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The performance of active constrained layer damping (ACLD) treatment for active structural-acoustic control of vibrating thin laminated cylindrical panels has been investigated. The constraining layer of the ACLD treatment has been considered to be made of vertically/obliquely reinforced 1-3 piezoelectric composite material. A Finite element model has been developed for the laminated panels integrated with the patches of ACLD treatment to describe the coupled structural-acoustic behavior of the panels enclosing an acoustic cavity. Both velocity and pressure rate feedback controls have been implemented to activate the patches. Symmetric and Anti-Symmetric cross-ply and antisymmetric angle-ply panels have been considered for evaluating the numerical results. Emphasis has also been placed on investigating the effect of the piezoelectric fiber orientation in the constraining layer and the shallowness angle of the cylindrical panels on the performance of the patches.